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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/945,454	08/31/2001	Steven Verhaverbeke	004936	3536
32588	7590	04/20/2004	USA/ETCH/METAL	
APPLIED MATERIALS, INC. 2881 SCOTT BLVD. M/S 2061 SANTA CLARA, CA 95050			EXAMINER MOORE, KARLA A	
			ART UNIT	PAPER NUMBER
			1763	
DATE MAILED: 04/20/2004				

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/945,454

Applicant(s)

VERHAVERBEKE ET AL.

Examiner

Karla Moore

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 1/29/04.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 11, 14-16, 18, 20-25, 44, 45, 48, 49 and 51 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 11, 14-16, 18, 20-25, 44, 45, 48, 49 and 51 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 8/31/01 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- |                                                                                                                        |                                                                                         |
|------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                                                       | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____                                                |

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## DETAILED ACTION

### *Claim Objections*

1. Claims 11 and 14-16 are objected to because of the following informalities: They include the recitation "integrated partial member module". Examiner assumed this recitation should read "integrated particle monitoring module" and has treated the claims as such. Appropriate correction and/or clarification is required.
2. In the list of the pending claims, Applicant has listed claims 26-45 as cancelled. It looks as if the list should read claims 26-43 are cancelled. Appropriate correction and/or clarification is required.

### *Claim Rejections - 35 USC § 103*

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).
4. Claims 11, 14-16, 18, 21, 23, 25, 44-45, 48-49 and 51 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,769,952 to Komino in view of U.S. Patent Publication No. 2001/0024691 A1 to Kimura et al.

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5. Komino discloses an apparatus for atmospheric and sub-atmospheric processing of a wafer in Figure 1, comprising: an atmospheric transfer chamber (20) having a first wafer handler (22) contained therein; a wet cleaning module coupled to said atmospheric transfer chamber (any of chambers 18 A-C; column 6, rows 7-15); a sub-atmospheric transfer chamber (14) having a second wafer handler (16) contained therein; a first load lock chamber (130A) coupled to said sub-atmospheric chamber and to said atmospheric chamber; and a first sub-atmospheric processing module (10A; column 5, rows 48-59) coupled to said sub-atmospheric transfer chamber wherein said sub-atmospheric module is selected from the group consisting of a CVD deposition module, a sputter module, and oxidation module, and etch module and an anneal module.

6. However, Komino fails to teach the apparatus comprising an integrated particle monitoring module for monitoring particles on a wafer surface coupled to said atmospheric transfer chamber and a controller for controlling said wet cleaning module and said integrated particle monitoring module wherein said controller includes stored instructions for determining the operation of said wet cleaning module depending on results in said integrated particle monitoring tool.

7. Kimura et al. teach the use of a sensor for measuring thickness, detecting the presence of foreign particles or recognition of a pattern formed on a substrate coupled to a transfer chamber (Figure 25; paragraphs 49-51, 88, 312 and 323) for the purpose of utilizing records as data for controlling the treatment time of a subsequent step and as data for judging the good or poor state of each treatment step or whether after completion of substrate processing whether the substrate is good or poor.

8. It would have been obvious to one of ordinary skill in the art at the time the Applicant's invention was made to have provided a integrated particle monitoring module in Komino in order to utilize records as data for controlling the treatment time of a subsequent step and as data to judge the good or poor state of each treatment step or whether after completion of substrate processing whether the substrate is good or poor as taught by Kimura.

9. Examiner notes that based on the motivation above, it would have been obvious to one of ordinary skill in the art that coupling a monitor/sensor to any sort of transfer chamber, regardless of the pressure maintained in the transfer chamber would have benefits.

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10. Examiner notes that Komino additionally teaches that the invention is not limited to the particular processing techniques mentioned in the disclosure for either the atmospheric or sub-atmospheric processing modules (column 6, rows 23-35 and column 11, rows 26-34).
11. With respect to claims 14 and 15, said apparatus further comprises a second load lock (130B) coupled between said atmospheric transfer chamber and said sub-atmospheric chamber. Both the first and second load lock are single wafer load locks (column 7, rows 10-18).
12. With respect to claim 16, a wafer cassette (24 A and 24 B) is coupled to said atmospheric transfer chamber for providing wafers to be loaded into said atmospheric chamber.
13. With respect to claim 21, 44, 45 and 47, as noted above the monitoring apparatus may also be a CD measurement tool/sensor for recognition of a pattern formed on a substrate or a sensor for measuring thickness (paragraph 88).
14. With respect to claim 23, as noted above any number of etch modules or ashing modules (in any of chambers 10 A-C) may be coupled to said sub-atmospheric chamber (column 5, rows 48-59).
15. With respect to claim 25, as noted above, Kimura teaches control of subsequent processing based on results from the monitoring section which are recorded in a recording means/controller (paragraphs 49-51).
16. With respect to claim 44 and 48, in the invention of Komino, a first and second single wafer thermal process module and a deposition module (in any of chambers 10 A-C) may be coupled to said sub-atmospheric transfer chamber (column 7, rows 25-28).
17. While Komino does not teach deposition of polysilicon in any of the sub-atmospheric chambers they would be capable of depositing polysilicon and this seen as an intended use similar to the limitations of claim 12.
18. Additionally with the recitation in claim 44, that provides for the controller to control said the silicon deposition chamber, the thermal process chamber and the wet cleaning chamber, as noted above, the controller can be used to control any subsequent process (see paragraph 51). In a cluster tool, which is typically designed so that numerous processing sequences can be executed, each of the chambers would necessarily be controlled by the computer, so that in a processing sequence/intended use where

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processing in any of these chambers takes place after a wet cleaning step—the processing may be modified as needed based on the results of an integrated particle monitor as taught in Kimura.

19. With respect to claim 49, as noted above, first and second load locks are coupled between the sub-atmospheric transfer chamber and atmospheric transfer chamber.

20. With respect to claim 51, as noted above Kimura teaches control of subsequent processing based on results from the monitoring section which are recorded in a recording means/controller (paragraphs 49-51).

22. Claims 20, 22 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Komino and Kimura as applied to claims 11, 14-16, 18, 21, 23, 25, 44-45, 48-49 and 51 above, and further in view Japanese Patent Publication No. 06-177093 A to Matsuo et al.

23. Komino and Kimura disclose the invention substantially as claimed and as described above.

24. However, Komino and Kimura fail to teach an ashing module coupled to said atmospheric transfer chamber, instead the ashing/etching chamber is coupled to the sub-atmospheric chamber so the process can take place at sub-atmospheric pressures.

25. Matsuo teach et al. teach the use of an ashing apparatus that is used at atmospheric pressure for the purpose of improved throughput, reduced cost, etching homogeneity and higher reliability (abstract, JPO and DERWENT).

26. It would have been obvious to one of ordinary skill in the art at the time the Applicant's invention was made to have carried out an ashing process at atmospheric pressure and to have thus coupled an ashing chamber to the atmospheric transfer chamber in Komino and Kimura in order to achieve increased throughput, reduced cost, etching homogeneity and higher reliability as taught by Matsuo.

#### ***Response to Arguments***

33. Claim objections of claims 24 and 51 are withdrawn.

34. Rejections based on Fairbairn et al. are withdrawn.

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35. Examiner has assumed that in the remarks submitted by Applicant all references which read "Kumino" are supposed to read "Komino".

36. Applicant's arguments filed with respect to the use of the combination of Komino and Kimura and claims 11, 14-16, 18, 20-25, 44-45, 48-49 and 51 have been fully considered but they are not fully persuasive. Applicant argues that Kimura fails to teach or suggest "to use an integrated particle monitoring tool to scan a wafer and utilize the results from the scan to determine cleaning parameters which are to occur in the wet cleaning molecule". Examiner maintains that the Komino reference (which discloses a wet cleaning module) and the Kimura reference, in combination, teach and/or fairly suggest the subject matter at issue. Examiner points out that the Kimura reference does fairly teach the use of a monitoring tool to detect a surface condition of a wafer, record that condition and use the recorded results in subsequent processing steps (see paragraphs 49-51). Kimura also teaches that the feature can be implemented in a wet processing apparatus (paragraph 395). In Kimura the examples are described in detail using a film thickness sensor; however, Kimura specifically states that the surface condition-monitoring sensor can take on other forms (see paragraphs 26, 402). Substituting a particle monitor is fairly disclosed and the substitution does not alter other aspects of the invention. For instance, in an embodiment where the surface condition-monitoring sensor is an integrated particle monitor, the results from the sensor would still be recorded and used in subsequent processing steps. Kimura does not teach that with the modification of the type of sensor, the invention functions entirely different or will have a different intended use. The only difference is that instead of monitoring a thickness of a film, the sensor monitors the presence of particles. Applicant argues that Kimura fails to teach the specifics of a configuration of an integrated particle monitor (i.e. the exact placement of the monitor or an illustration showing what the monitor looks like) or the specifics of a process of using an integrated particle monitor. Examiner points out that the pending claims do not recite such specifics. The prior art relied upon (Komino and Kimura in combination) fairly teaches the limitations as claimed.

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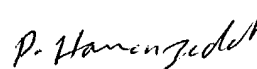
**Conclusion**

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Karla Moore whose telephone number is 571.272.1440. The examiner can normally be reached on Monday-Friday, 8:30am-5:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory Mills can be reached on 571.272.1439. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

km  
13 April 2004

  
Parviz Hassanzadeh  
Primary Examiner  
Art Unit 1763